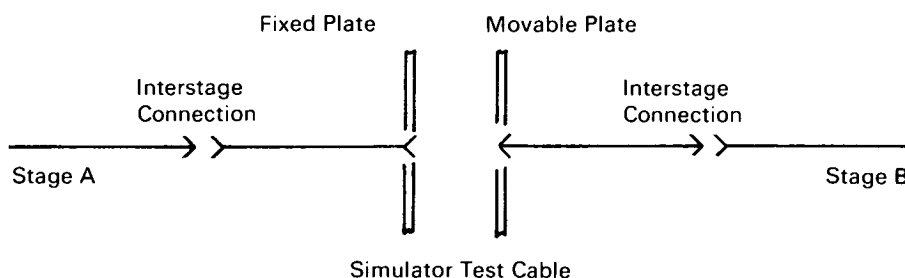


NASA TECH BRIEF



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Separation Simulator



The problem:

To develop a missile stage separation simulator. Such a device would simulate the occurrence of stage separation and subsequent docking of a rocket in flight so that the separation and reconnection of electrical connectors could be tested and evaluated.

The solution:

A separation simulator, consisting of a control panel and an electromechanical simulator unit, provides a method of simulating electrical separation of space flight vehicle stages. This test fixture is created to simulate the electrical separation during preflight checkout.

The simulation is accomplished by electrically inserting the simulator between the normal interstage couplings of the flight vehicle. The actual separation and reconnection of the electrical connectors are accomplished by energizing two solenoids.

The control panel of the simulator unit can be located in a remote area away from the simulator unit. This permits the device to be used in applications where there are elements of danger and the need to perform a mate or separation function can be effected from a safe distance.

How it's done:

The separation simulator, shown in the figure, consists of an electrical control panel and an electromechanical simulator unit. The control panel contains all switches and indicators to enable remote operation of the simulator unit which performs the function of mechanically mating or separating the prescribed interstage electrical connections.

The separation simulator, requiring 28 Vdc, 110 Vac, and a pneumatic pressure regulated to 225 psi, is actuated by either the mate or separate solenoids. When either of these solenoids is energized, a regulated gas pressure of 225 psi is applied to an actuator which raises or lowers a plate, depending upon which solenoid was energized.

Male connectors are mounted on a movable plate while female connectors are mounted on a fixed plate. When the mate solenoid is energized, the actuator causes the movable plate to be driven toward the fixed plate, thus causing the connectors to mate. Connector separation is obtained when the other solenoid is energized.

Connector separation takes approximately 0.192 second. Remate of the connectors is much slower to prevent connector damage.

(continued overleaf)

Notes:

1. The separation simulator could be used in commercial applications requiring a quick disconnect of single or multiple electrical connectors, especially where high currents and flash-pots are in use.
2. This information would be of interest to the electrical power industry and companies manufacturing electrical connectors.
3. No further documentation is available. Inquiries may be directed to:

Technology Utilization Officer
Kennedy Space Center
Kennedy Space Center, Florida 32899
Reference: B69-10315

Patent status:

This invention is owned by NASA, and a patent application has been filed. Royalty-free, non-exclusive licenses for its commercial use will be granted by NASA. Inquiries concerning license rights should be made to NASA, Code GP, Washington, D.C. 20546.

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